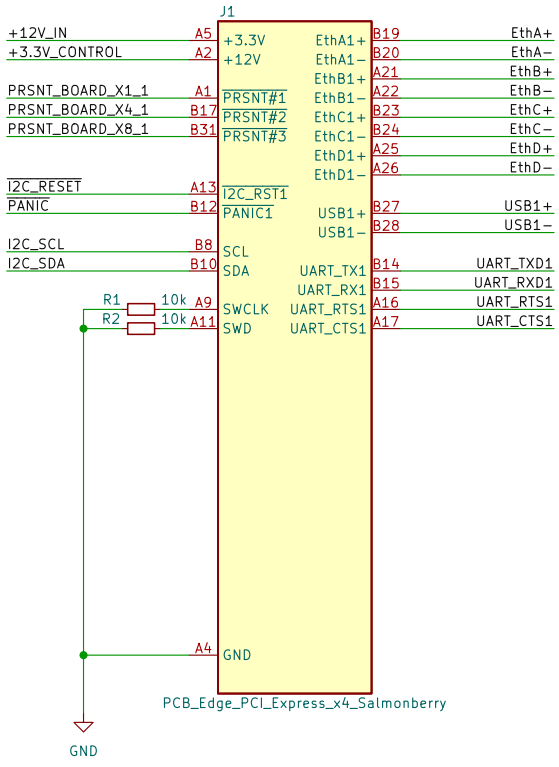
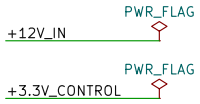
Salmonberry Pi, Fruit \ ‘früt \ CM4

1 a : a product of plant growth

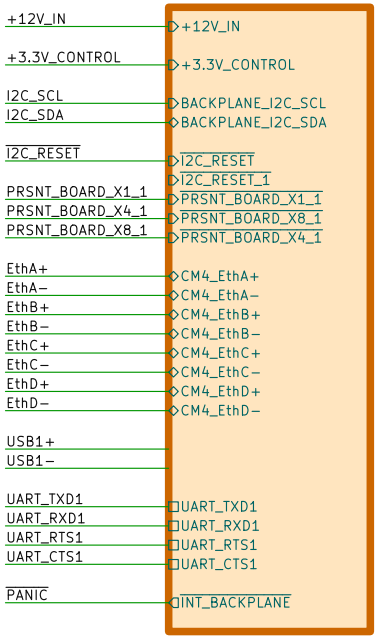
b : Salmonberry Pi’s Raspberry Pi Compute Module 4 (CM4) carrier and support systems

Connector





CM4



Chassis

H1 MountingHole

H2 MountingHole

Fiducials

FID1 Fiducial

FID2 Fiducial

FID3 Fiducial

Cooling Block / Heatsink

COOLER1

Mounting Holes
53−61mm_NorthBridge_45deg_arms

M.2 Standoff

Wuerth 9774015243R

Hirose Connectors for CM4

DF40HC(3.0)−100DS−0.4V (2x)

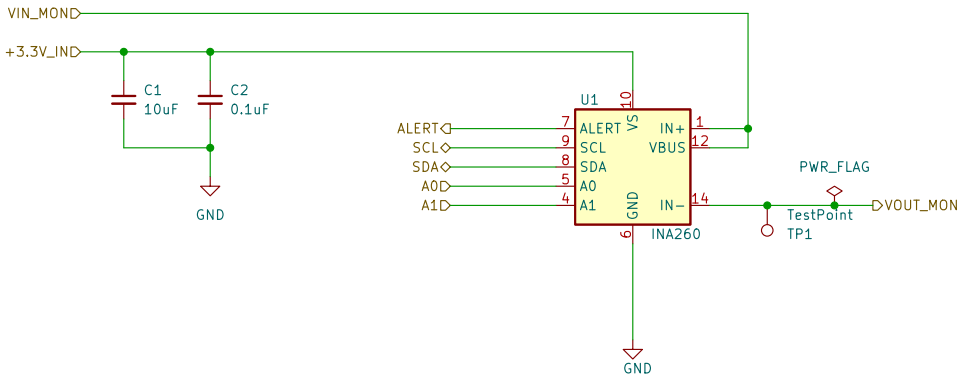
Sheet: /
File: fruit.kicad_sch

Title: Salmonberry Pi, Fruit \ ‘früt \ CM4

Size: A4	Date: 2022−01−12	**Rev: 4**
KiCad E.D.A.	kicad 6.0.0−d3dd2cf0fa−116~ubuntu21.10.1	Id: 1/15

I2C Power Monitoring

Voltage & Current



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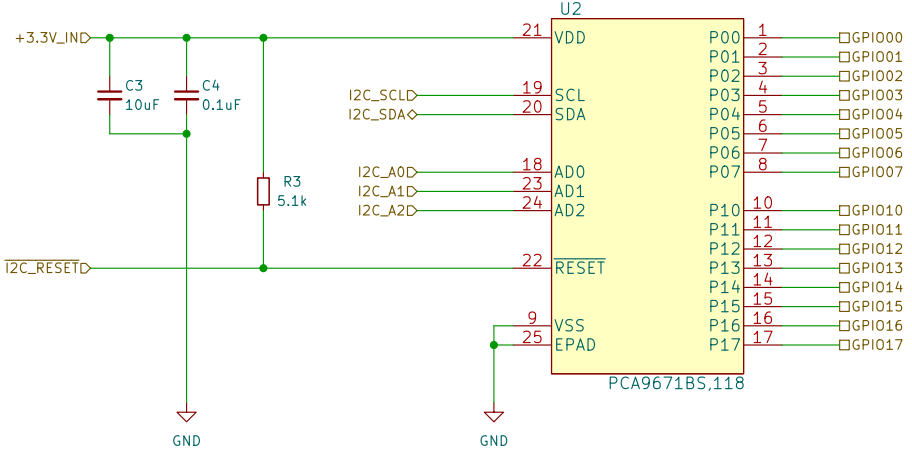
File: psumon.kicad_sch

Title: I2C Power Monitoring (Voltage & Current)

Size: A5	Date: 2022−01−12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0−d3dd2cf0fa~116~ubuntu21.10.1		Id: 2/15

I2C GPIO

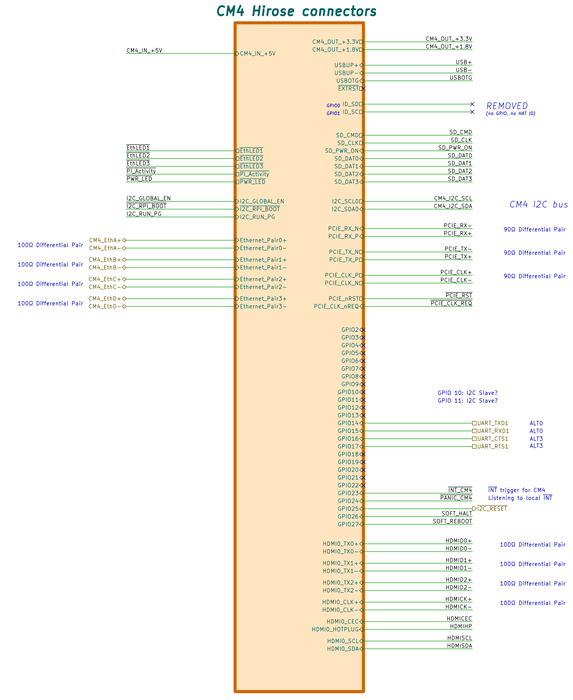


Sheet: /CM4/I2C GPIO1/		
File: i2cgpio.kicad_sch		
Title:		
Size: A5	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa~116~ubuntu21.10.1		Id: 3/15

Fruit

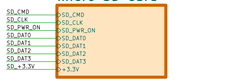
Salmonberry Pi's Raspberry Pi Compute Module 4 (CM4) carrier and support systems

CM4 Hirose connectors

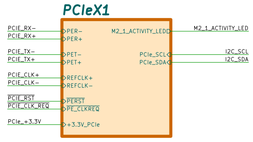


USB 2.0 MUX

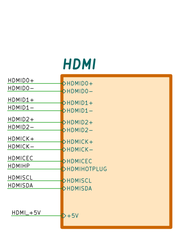
micro SD card



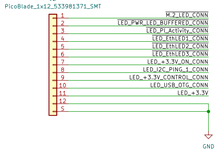
PCIeX1



HDMI

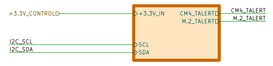


J2

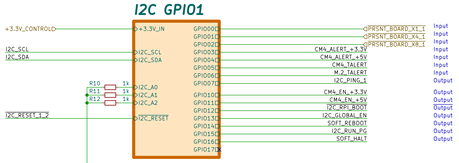


I2C

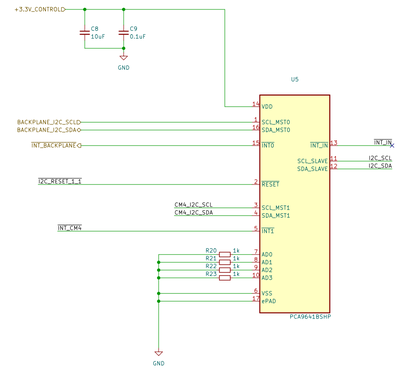
Sensors



I2C GPIO1



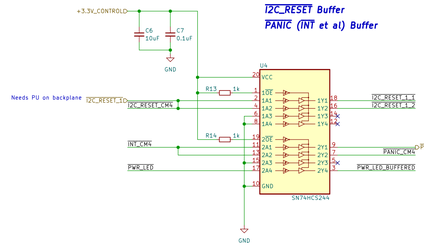
U5



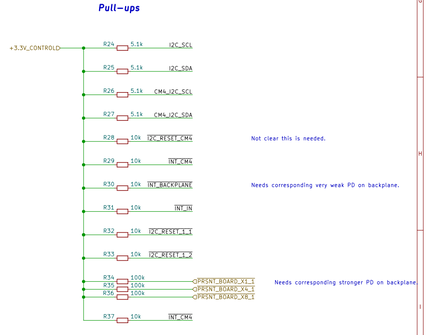
FIXME: USB hub and Coral TPU?

I2C_RESET Buffer

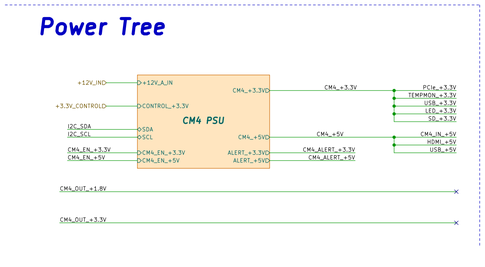
PANIC (INT et al) Buffer



Pull-ups

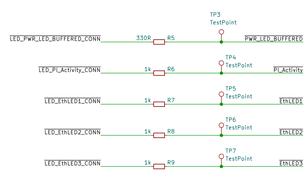


Power Tree

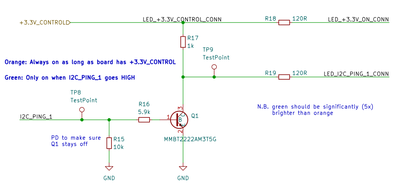


Indicators — M.2

Indicators — CM4



Indicators — I2C



Sheets: /CM4/

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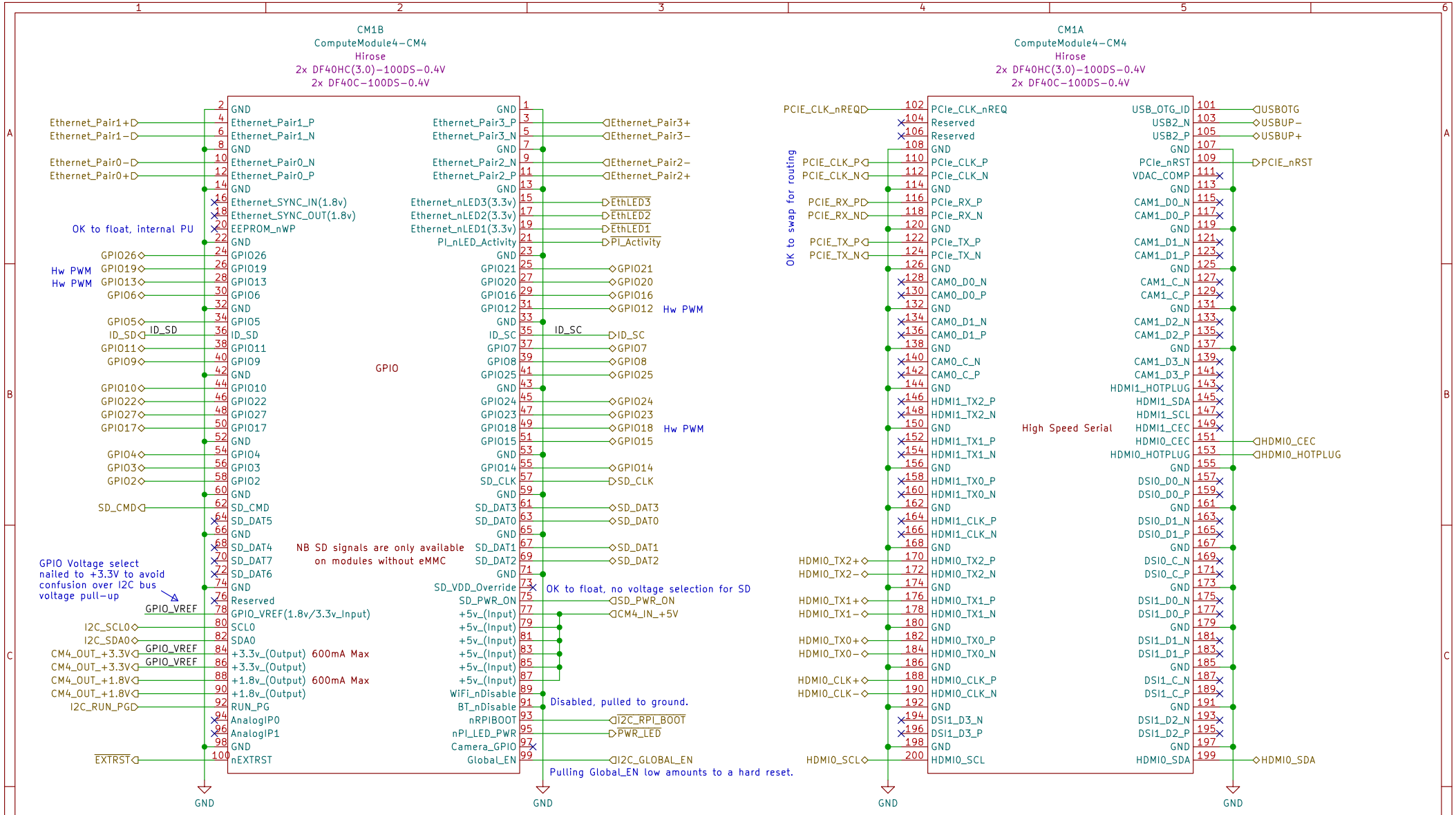
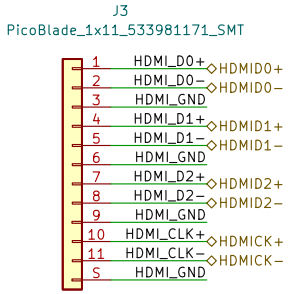
Title: Raspberry Pi Compute Module 4

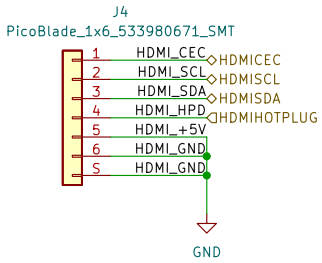
Size: A1	Date: 2022-01-12	Rev: 4
KiCad E.D.A. kicad 6.0.0-d36d2f0fe-116-ubuntu21.10.1		Id: 5/15


CM1B
ComputeModule4-CM4
Hirose
2x DF40HC(3.0)-100DS-0.4V
2x DF40C-100DS-0.4V
GPIO
NB SD signals are only available on modules without eMMC
OK to float, internal PU
Hw PWM
Hw PWM
ID_SD
ID_SD
ID_SC
GPIO Voltage select nailed to +3.3V to avoid confusion over I2C bus voltage pull-up
GPIO_VREF
GPIO_VREF
GPIO_VREF
600mA Max
600mA Max
Hw PWM
Hw PWM
OK to float, no voltage selection for SD
Disabled, pulled to ground.
Pulling Global_EN low amounts to a hard reset.
GND
GND
CM1A
ComputeModule4-CM4
Hirose
2x DF40HC(3.0)-100DS-0.4V
2x DF40C-100DS-0.4V
OK to swap for routing
High Speed Serial
GND
GND
CERN-OHL-W v2 or later
Copyright © 2022 Christian Kuhtz
Sheet: /CM4/CM4 Hirose connectors/
File: cm4hirose.kicad_sch
Title: CM4 Hirose connector mappings
Size: A4
Date: 2022-01-12
Rev: 4
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa-116~ubuntu21.10.1
Id: 8/15

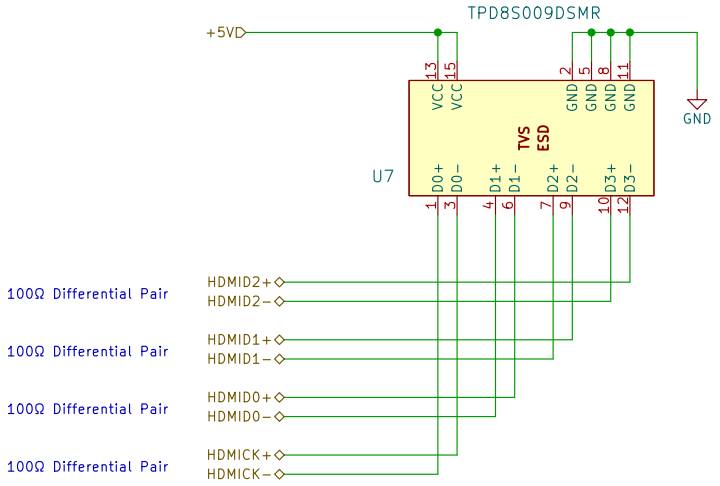
CM4 HDMI Jack

Connectors

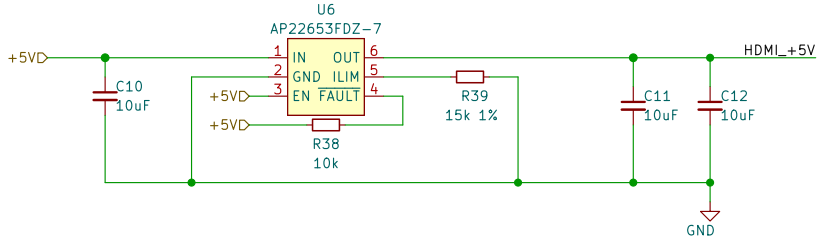




ESD



Current Limit switch for port 1



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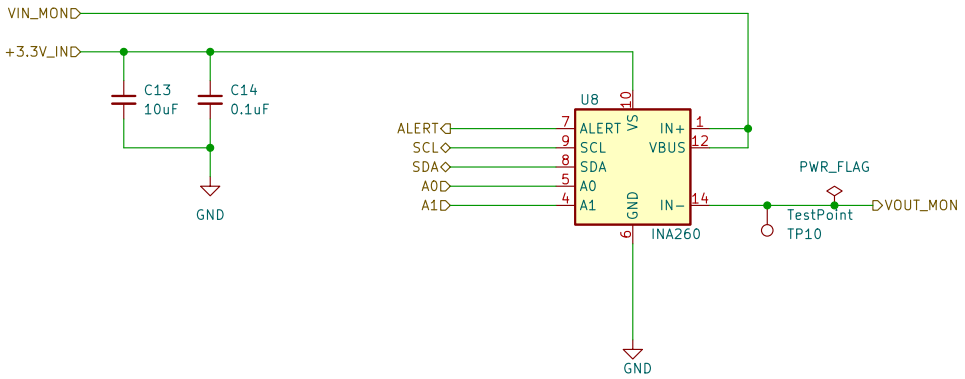
Size: A4	Date: 2022−01−12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0−d3dd2cf0fa−116~ubuntu21.10.1		Id: 9/15

I2C Power Monitoring

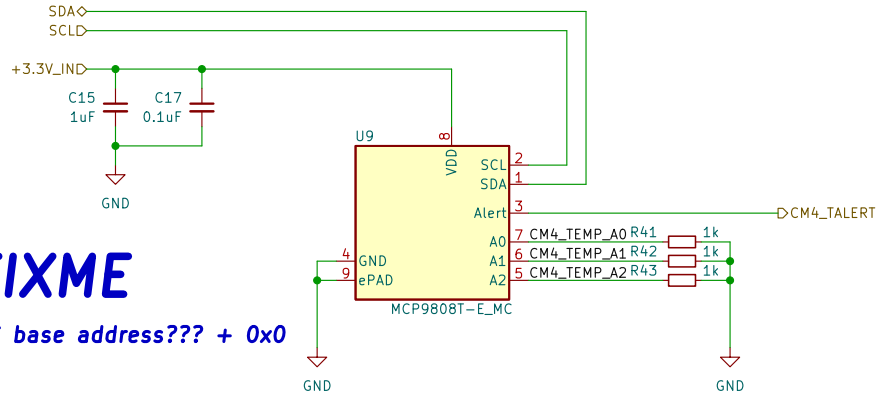
Voltage & Current



Sheet: /CM4/CM4 PSU/I2C PSU Monitor +3.3V/		
File: psumon.kicad_sch		
Title: I2C Power Monitoring (Voltage & Current)		
Size: A5	Date: 2022−01−12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0−d3dd2cf0fa~116~ubuntu21.10.1		Id: 12/15

Sensors

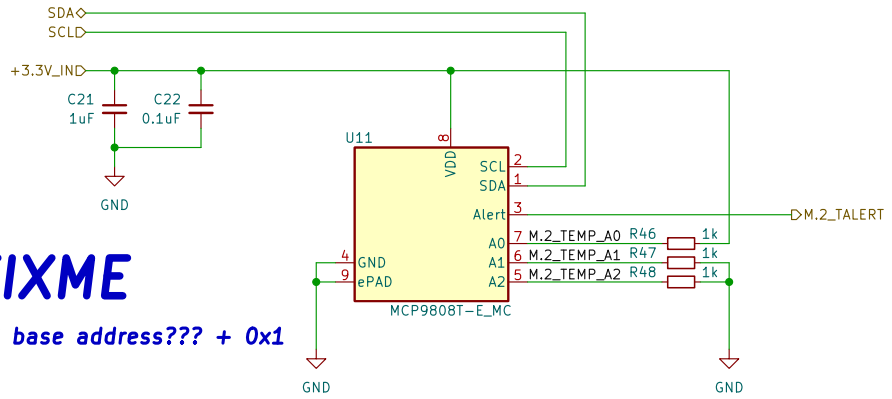
Temperature monitoring via I2C
(place under or near CM4)



FIXME

I2C base address??? + 0x0

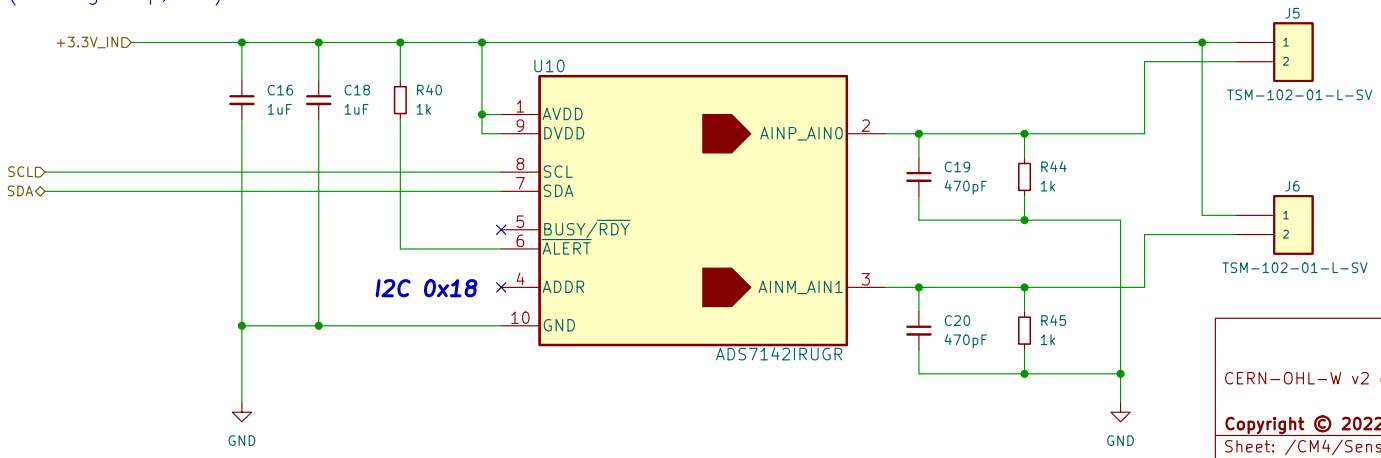
Temperature monitoring via I2C
(place under or near M.2)



FIXME

I2C base address??? + 0x1

2x headers for 10K NTC thermistors
(cooling loop, etc)



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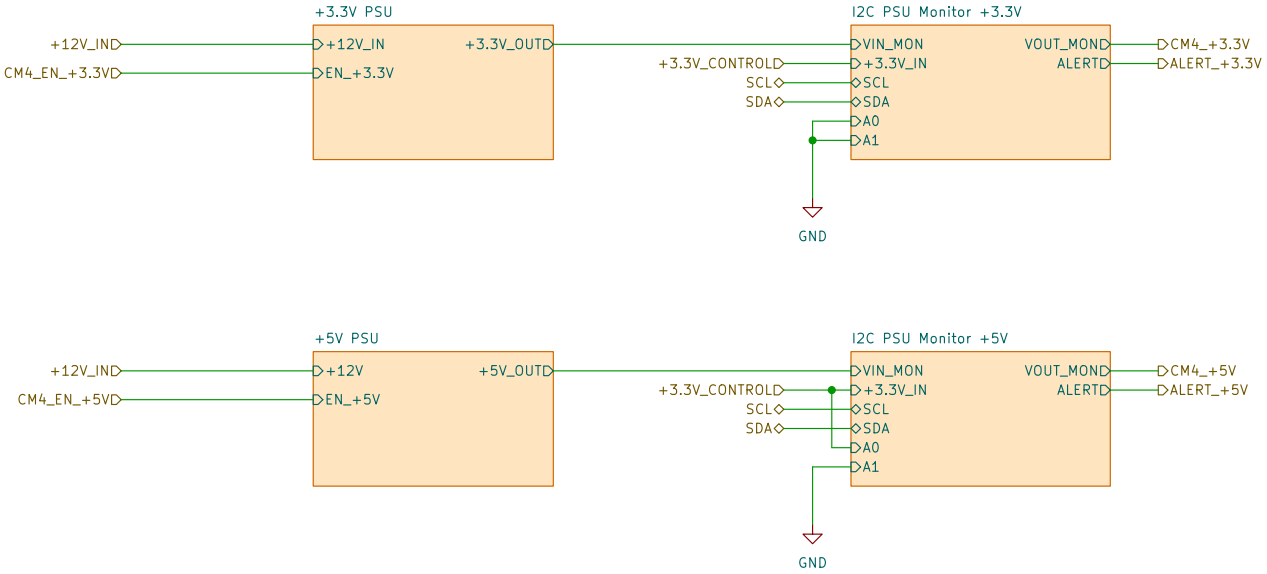
File: tempsensors.kicad_sch

Title:

Size: A4	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa-116~ubuntu21.10.1		Id: 14/15

CM4 PSUs



Sheet: /CM4/CM4 PSU/
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Title: CM4 PSUs

Size: A4	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A.	kicad 6.0.0-d3dd2cf0fa-116~ubuntu21.10.1	Id: 15/15

PCIe

PCIe x1 draws maximum of +3.3V @ 3A,
use separate power supply if needed

TX and RX can have PN swaps to improve routing

+3.3V_PCIe → +3.3V

PERST → M2_1_PERST
PE_CLKREQ → M2_1_CLKREQ

PER+ → M2_1_PER−
PER− → M2_1_PER+

PET+ → M2_1_PET−
PET− → M2_1_PET+

REFCLK− → M2_1_REFCLK−
REFCLK+ → M2_1_REFCLK+

PCIe_SCL → ×
PCIe_SDA → ×

CM4 PCIe M.2 M key Slot 1

+3.3V	+3.3VPCIe	
		M2_ACTIVITY_LED → M2_1_ACTIVITY_LED
M2_1_PERST	PERST	
M2_1_CLKREQ	CLKREQ	
M2_1_PER−	PER−	
M2_1_PER+	PER+	
M2_1_PET−	PET−	
M2_1_PET+	PET+	
M2_1_REFCLK−	REFCLK−	
M2_1_REFCLK+	REFCLK+	

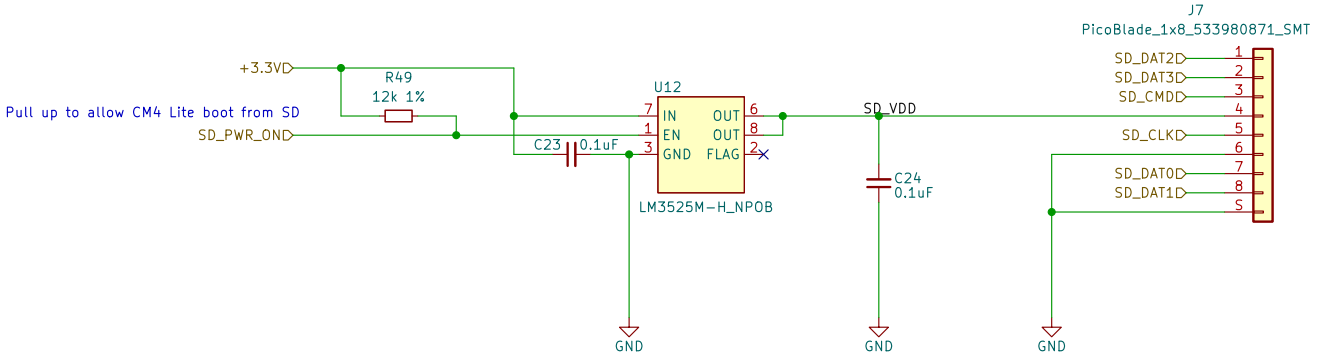
Intentionally left blank when PCIe switch removed.

Sheet: /CM4/PCIeX1/
File: cm4pcie.kicad_sch

Title: CM4 PCIe

Size: A3	Date: 2022−01−12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0−d3dd2cf0fa−116~ubuntu21.10.1		Id: 22/15

CM4 Lite microSD card slot

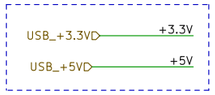


Sheet: /CM4/micro SD card/
File: cm4sdcard.kicad_sch

Title: microSD slot for CM4 Lites

Size: A5	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa~116~ubuntu21.10.1		Id: 27/15

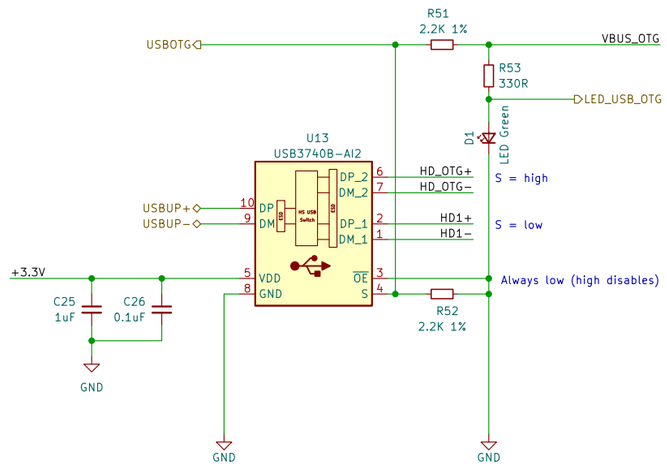
USB 2.0 MUX for USB 2.0 port and USB-on-the-go (OTG)



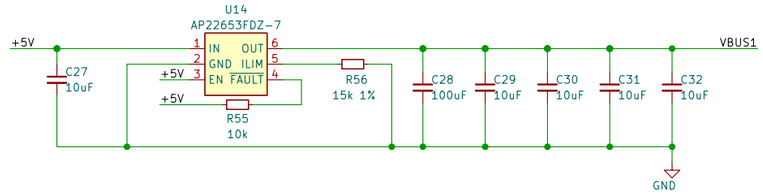
USB 2.0 MUX for OTG (w/ ESD)

If a cable is plugged into the UTG USB-C port, USB-C port is bypassed and CM4 acts as a USB device (VBUS_UTG high)
Source: Truth table 4-1 in USB3840 datasheet

ESD protection provided on all DM/DP pins.



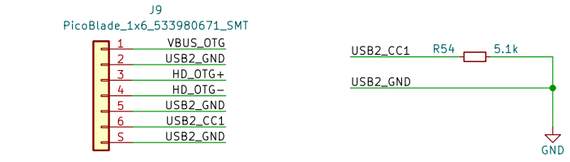
Current Limit switch for port 1



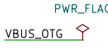
USB-C connector with USB 2.0 signals

#1

USB-C CM4-as-device (OTG) with USB 2.0 signals



#OTG



USB 2.0 over USB-C routing:

- USB-C A5 (CC) 56K 5% resistor to VBUS
- USB B6, B7 not present
- A6/A7 carry DP
- All VBUS pins connected (A4, B4, A9, B9)
- All GND pins connected (A1, B1, A12, B12)

Figure 3-23 shows a USB Type-C to *USB 2.0* Standard-A cable assembly.

Figure 3-23 USB Type-C to *USB 2.0* Standard-A Cable Assembly

Table 3-13 defines the wire connections for the USB Type-C to *USB 2.0* Standard-A cable assembly.

Table 3-13 USB Type-C to *USB 2.0* Standard-A Cable Assembly Wiring

USB Type-C Plug		Wire		USB 2.0 Standard-A plug	
Pin	Signal Name	Wire Number	Signal Name	Pin	Signal Name
A1, B1, A12, B12	GND	1	GND_PWRrt1	4	GND
A4, B4, A9, B9	VBUS	2	PWR_VBUS1	1	VBUS
A5	CC	See Note 1			
B5	VCONN				
A6	Dp1	3	UTP_Dp	3	D+
A7	Dn1	4	UTP_Dn	2	D-
Shell	Shield	Braid	Shield	Shell	Shield

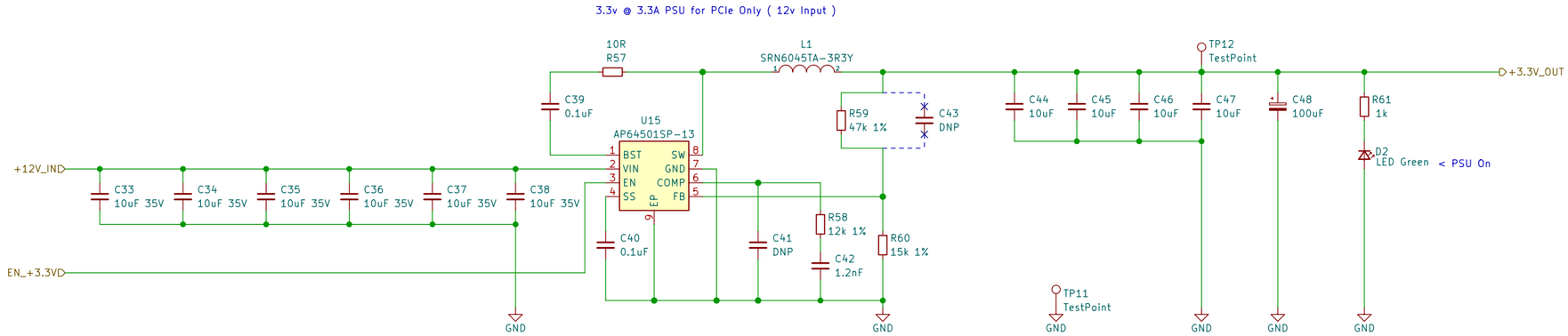
Notes:
1. Pin A5 (CC) of the USB Type-C plug shall be connected to VBUS through a resistor Rp (56 kΩ ± 5%). See Section 4.5.3.2.2 and Table 4-15 for the functional description and value of Rp.
2. Contacts B6 and B7 should not be present in the USB Type-C plug.
3. All VBUS pins shall be connected together within the USB Type-C plug. Bypass capacitors are not required for the VBUS pins in this cable.
4. All Ground return pins shall be connected together within the USB Type-C plug.
5. All USB Type-C plug pins that are not listed in this table shall be open (not connected).

Source: *Figure 3-23 and Table 3-13 in USB 3.1 specification*

Sheet: /CM4/USB 2.0 MUX/		
File: cm4usb.kicad_sch		
Title: USB 2.0 MUX for USB 2.0 port and USB-on-the-go (OTG)		
Size: A3	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa~116~ubuntu21.10.1		Id: 41/15

+3.3V PSU @ 3A peak

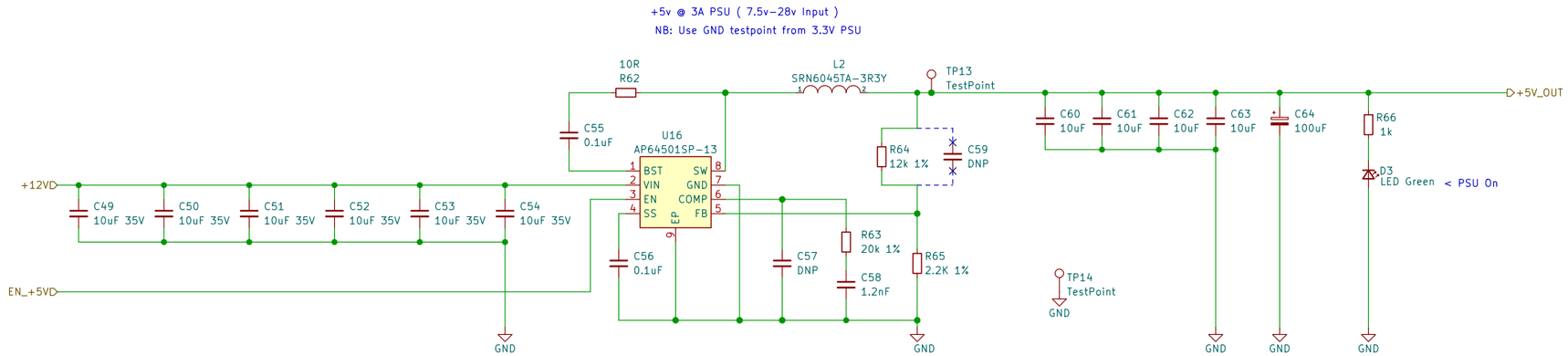
NB: Borrowed/Inspired by Raspberry Pi Foundation's CM4IO



Sheet: /CM4/CM4 PSU/+3.3V PSU/		
File: psu3v3.kicad_sch		
Title: +3.3V PSU		
Size: A3	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa-116~ubuntu21.10.1		Id: 59/15

+5V PSU @ 3A peak

NB: Borrowed/Inspired by Raspberry Pi Foundation's CM4IO

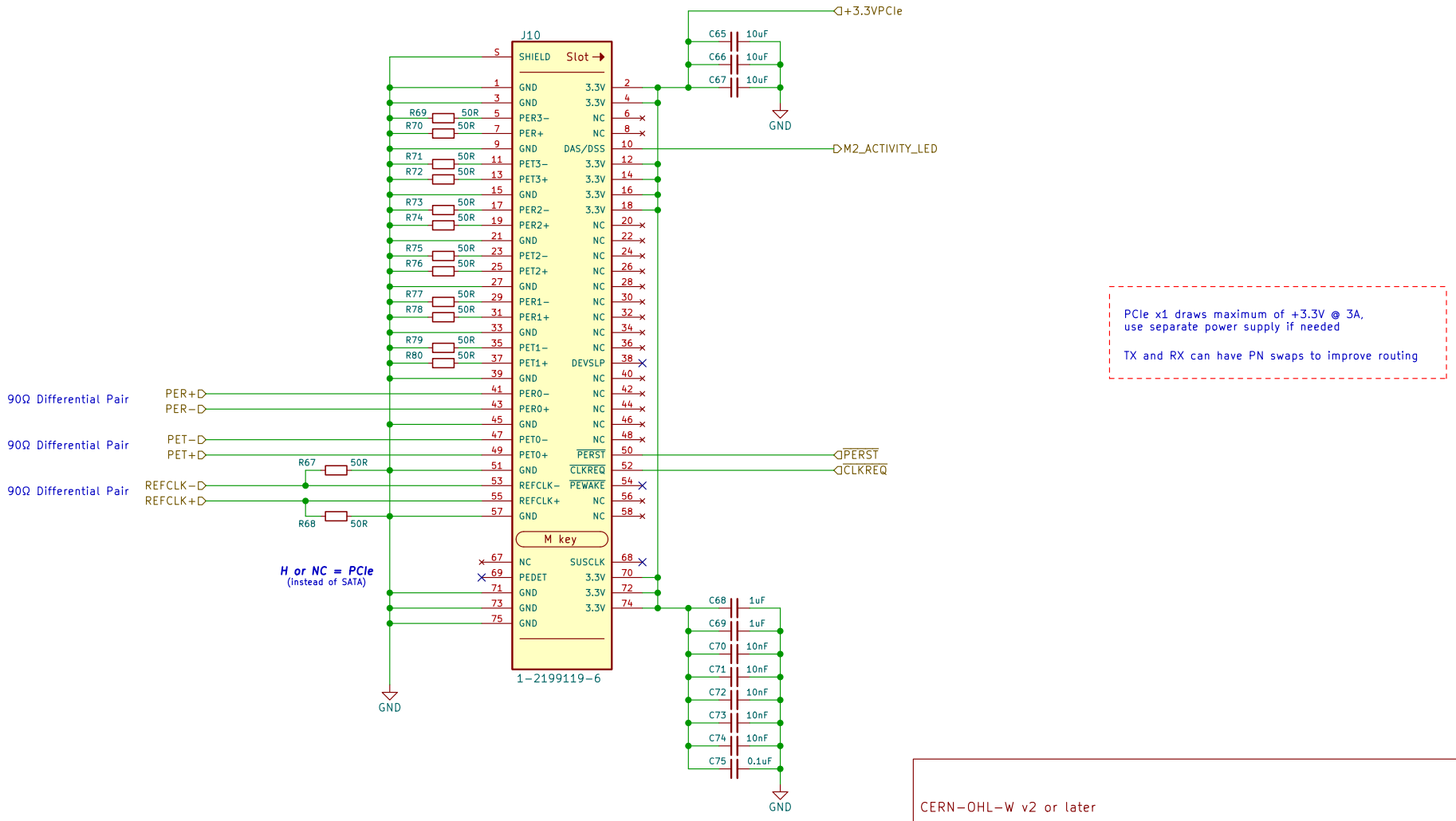


Sheet: /CM4/CM4 PSU/+5V PSU/
File: psu5v.kicad_sch

Title: +5V PSU

Size: A3	Date: 2022-01-12	**Rev: 4**
KiCad E.D.A. kicad 6.0.0-d3dd2cf0fa-116~ubuntu21.10.1		Id: 64/15

M.2 M key on PCIeX1



PCIe x1 draws maximum of +3.3V @ 3A,
use separate power supply if needed

TX and RX can have PN swaps to improve routing

Sheet: /CM4/PCIeX1/CM4 PCIe M.2 M key Slot 1/
File: cm4m2mkey.kicad_sch

Title: M.2 M key on PCIeX1

Size: A4	Date: 2022−01−12	**Rev: 4**
KiCad E.D.A.	kicad 6.0.0−d3dd2cf0fa−116−ubuntu21.10.1	Id: #/15